

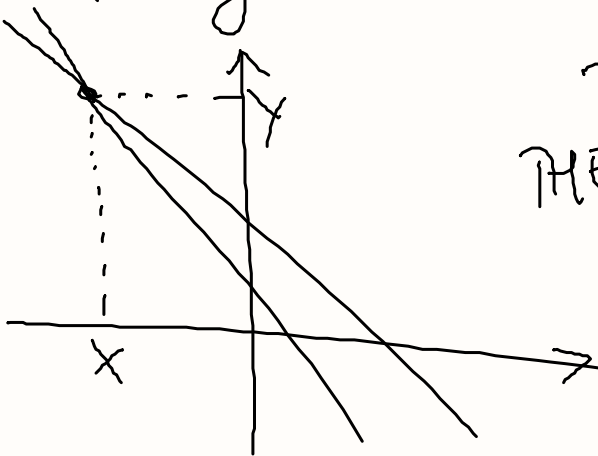
CH. 4.4 (p. 244)

SOLVE SYSTEMS OF LINEAR  
EQUATIONS USING MATRIX EQUATIONS

$$\begin{cases} x + y = 8 \\ 2x + y = 1 \end{cases}$$

$$y_1 = 8 - x$$

$$y_2 = 1 - 2x$$



THE SOLUTION OF  
THE SYSTEM :  
COORDINATES OF  
POINT INTERSECTION  
OF TWO LINES  $(x, y)$

## STANDARD FORM OF LINEAR EQUATION

$$AX + BY + CZ = D$$

↑  
1<sup>st</sup>

↑  
2<sup>nd</sup>

↑  
3<sup>rd</sup>

← CONSTANT

$$5x - y + 13z = 4 \text{ STANDARD FORM}$$

$$1 - z = 3x + 5y$$

$$-3x - 5y - z = -1$$

MATRIX EQUATION

$$\begin{cases} x + y = 8 \\ 2x + y = 1 \end{cases}$$

$$\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 8 \\ 1 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 8 \\ 1 \end{bmatrix}$$

$$A^{-1} B = \begin{bmatrix} x \\ y \end{bmatrix}$$

1. make sure that equations are WRITTEN IN A STANDARD FORM
2. WRITE MATRIX FOR LEFT SIDE, A
3. WRITE MATRIX FOR RIGHT SIDE, B
4.  $[A][X] = [B]$
5. RECALL MATRIX A
6. TAKE ITS INVERSE  $A^{-1}$
7. RECALL MATRIX B
8.  $A^{-1}B$  ENTER ANSWER  $\begin{bmatrix} x = \\ y = \end{bmatrix}$

$$\begin{cases} 3x - 2y = 11 \\ 5x + 1y + 7z = 0 \\ 4x + 11y + z = 15 \end{cases}$$

$$A = \begin{bmatrix} 3 & -2 & 0 \\ 5 & 1 & 7 \\ 4 & 11 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 11 \\ 0 \\ 15 \end{bmatrix}$$

PRACTICE: REPRODUCE THE HANDOUT

#19, 21 p. 249

HOME: p. 249 #20, 24, 26 WRITE IN  
MATRIX FORM  
AND SHOW THE ANSWER

#24  $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 9 & -1 \\ 2 & 10 & -2 \end{bmatrix}$   $B = \begin{bmatrix} 5 \\ 8 \\ -2 \end{bmatrix}$

#26 2<sup>nd</sup> row in A  $\begin{matrix} 5 & 0 & 8 \end{matrix}$

$$5x + 0y + 8z = -16$$
$$\frac{1}{2} \quad 1 \div 2 \rightarrow \frac{1}{2}$$